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General Notes.

GEOLOGY AND PALEONTOLOGY.

The Discovery of a New Fauna in the Cenozoic Beds near Zagreb, and its Relations with the Recent Fauna of the Caspian Sea.—For a number of years, Professor Brusina of the University of Zagreb has been studying the Molluscan fauna of that region. In a recent publication he reports finding a wonderfully rich fossil bed at Markusevic from which he obtained 101 species, over half of which are new. A generic comparison of the fauna of Markusevic with that of Okruljak shows that the Pelecypoda are the dominant type in the latter locality, while the gasteropods prevail in the former. A comparison of the fauna of these two localities in Croatia with the recent fauna is of extreme interest. To quote Professor Brusina, "They seem to have relations with the fauna of Lake Baikal; my new genus, *Baglivia*, is similar to the genus *Liobaikalia* Martens (*Leucosia* Dybowski). Also some of our *Valvata* recall some species of the same genus which live in Lake Baikal.

"I have mentioned the genus *Caspia*. Dr. W. Dybowski, to whom we are indebted for the most important papers on the Gasteropods of Lake Baikal and of the Caspian Sea, created this genus for a series of small species which live in the Caspian Sea. Now, I have discovered near Zagreb several fossil species of the same genus. In a paper published in 1884, I established the genera *Zagrabica* and *Micromelania* for some fossils found near Zagreb; in 1891, in the work referred to on the recent Molluscs in the Caspian Sea, Dybowski describes several species of *Micromelania* and one species of *Zagrabica* now living in that sea. Thus, the genera *Zagrabica*, *Micromelania*, *Caspia* and *Limnocardium* (*Adacna*), fossil in Croatia, are to-day living in the Caspian Sea. It is, then, evident that the present fauna of this sea is the remnant of the rich fauna of the Congeria beds of Austria, Hungary, Banat, Croatia, Slavonia, Servia, etc., although, quite recently this fact has been doubted.

"A comparison between the fossil fauna of the neighborhood of Zagreb with the recent fauna of the Caspian Sea destroys the hypotheses of Humboldt, Peschel, Middendorf and others, concerning the origin and relationship of the Caspian Sea and of its present fauna. While these authors claim the origin of the fauna of the Caspian Sea, in the Black and circumpolar seas, my studies and my researches lead me to look for its origin in the pre-pleistocene Cenozoic beds of Croatia

and in those of the other countries above cited." (Proceeds. Congrès. Internatl. de Zool. Deuxième Sess. a Moscou, 1892. Deuxième Partie Moscou, 1893.)

Coasts of Bering Sea and Vicinity.—Mr. G. M. Dawson's notes on some of the coasts and islands of Bering Sea confirm the theory of a former land connection of Asia and North America in that region. Soundings in Bering Sea show that the continental plateau of North America extends westward in Bering Sea, meeting with that of Asia in the vicinity of Cape Navarin, north latitude about 60°. The available evidence shows that this submarine plateau, together with much of the flat land of western Alaska, was covered by a shallow sea during the later part of the Miocene period. The formation of the Aleutian Islands began in the late Eocene or early Miocene, continued with vigor during Miocene, and later in an intermittent way up to the present time. No traces of glaciation by land ice were found in the Bering Sea region, and the absence of erratics above the sea-line shows that it was never submerged for any length of time below ice-encumbered waters. (Bull. Geol. Soc. Am. Vol. 5, 1894).

The Age of the Pliocene Mammalian Fauna of the Central Plateau of France.—M. Deperet recognizes two distinct and successive mammalian faunas in the different Pliocene horizons of Italy, France and England. First, an older one, belonging to the lower and middle Pliocene. It is characterized by a great number of old extinct forms, as *Hippotherium*, *Hyaenarctos*, *Paleoryx*, *Dolichopithecus*, many of the Glires, large Monkeys with Asiatic affinities, Antilopes related to the African species, and by the rarity of the relative simplicity of the horns of the Cervidæ. The absence of *Equus*, *Bos* and *Elephas* constitutes a negative character throughout all Europe. Second, a more recent fauna, found only in the upper Pliocene. The old genera, except the *Mastodon*, have disappeared; the horse supplants *Hipparion*; Bovidæ appear for the first time in Europe; Monkeys persist in Italy; *Elephas meridionalis* is found nearly everywhere with *Mastodon arvernensis* and *M. borsoni*.

In Italy the old fauna is badly represented by sporadic débris, but the recent types are found abundantly in the brackish and fluviatile deposits which overlie the marine Pliocene of Astesan, and in the fluviatile gravels in the valley of the Arno.

In the south of France the older fauna occurs and affords the best means of determining the exact stratigraphic position of the beds in which the fossils are found.

In la Bresse the older fauna is found in the lacustrine deposits of the lower Pliocene and in the fluvatile beds of the middle Pliocene; the recent fauna is finely developed in the sands of Chagny.

In England the Hipparion fauna is found in the nodule-beds at the base of the red Crag and in the red Crag itself, while the *Equus* fauna is contained in the fluvio-marine Crag.

A comparison of stratigraphic details shows that the older Pliocene fauna is lacking in the Central Plateau region of France, and the horizon of Perrier with the Mastodon bearing sands of Puy, of Coupet and of Vialette must be placed in the upper Pliocene notwithstanding the total absence of *Elephas meridionalis*.

The fauna of Sainzelles presents the same characters as that of Perrier and can be considered only as a simple local sub-division of the same bed.

From these facts M. Deperet also concludes that the basalts intercalated in the gravels of Perrier and the Mastodon-bearing sands of Puy, and the breccias which accompany them, belong to the upper Pliocene, and, chronologically, are very near to the basalts of the Plateau. (Compte-rendu des Séances de la Soc. Geol. de France, 1893.)

Plistocene Diastrophism in the California Coast.—Mr. A. C. Lawson has obtained data which establishes (1) The uplift from the sea of the entire coast of California from San Francisco to San Diego, in Plistocene time, from 800 to 1500 feet. (2) A differential movement of the crust, to a remarkable degree, in the vicinity of Catalina Island, and near the city of San Francisco, also of Plistocene age.

The uplift changed the contour of the coast, which at the close of the Plistocene had had the aspect of an archipelago and was well supplied with harbors. The Channel Islands are remnant of the Pliocene condition, but the harbors have disappeared with one exception.

The orogenic movement resulted in the lifting of the Merced series, into its present condition and the upthrust of the Montara Mountain, which is described as having a central granite mass from which the strata of all ages dip quaquaversally. The mass antedates the oldest sedimentary strata on its flanks. In his conclusions the author states that the subdivisions Eocene and Neocene are not suited to the west coast of California. The reversal of the epeirogenic movement from a process of depression to that of uplift is believed to correspond

with the beginning of the Plistocene, so there was no break in the marine conditions throughout the epochs, the Pliocene merging into the Plistocene. Between the Pliocene and Miocene, however, there was an important interval of erosion. (Bull. Dept. Geol. University of California, Vol. 1, 1893.)

Geological News.—**PALEOZOIC.**—Mr. M. R. Campbell's stratigraphical studies in Montgomery and Pulaski Counties in western Virginia, result in the establishment of two periods of disturbance in the Appalachian system. One folded the limestones and produced basins at the beginning of the Devonian period, the other elevated these basins and brought the period of sedimentation in them to a close near the middle of the lower Carboniferous period. These two periods of disturbance, in connection with other well established periods of overlaps show that deformation in the Appalachian system has been practically continuous since early Paleozoic time. (Bull. Geol. Soc. Am. Vol. 5, 1894.)

MESOZOIC.—Dr. J. W. Gregory describes two new species of Chlostomata (*Membranipora jurassica* and *Onychocella bathonica*) from the Jurassic beds of Normandy, France. This is the first description of Polyzoa of this order in the Jurassic. (Geol. Mag., Feb., 1894.)

From the evidence of fossil flora and certain stratigraphical facts, Mr. Benjamin Smith Lyman is inclined to put the Newark Brownstone at an earlier age than Mesozoic. Since the recent researches of Canadian geologists have proved that much of the so-called Trias of New Brunswick and Nova Scotia is really Permian and even Carboniferous, the author calls attention to the doubtful determination of the age of the beds in question, and suggests a thorough examination of the paleontological record in order to determine their position. (Proceeds. Amer. Philos. Soc. Vol. xxxiii, 1894.)

CENOZOIC.—The age of the yellow clay in the eruptive formations of Gravenoire, in which a human skeleton was found in 1891, has been fixed by MM. Girod and Gautier. A study of the stratigraphy and fauna of that region leads to the conclusion that the bed in question is a post-glacial deposit of the Reindeer age. (Rev. Scientifique, Feb., 1894.)

The collection of Bird bones from the Miocene of Grive-St. Alban, France, sent by Dr. Forsyth Major to Mr. Lydekker for identification, comprises six determinable species, of which four are new: *Strix sanctialbani*, *Palaeortyx maxima*, *P. grivensis*, *Totanus major*. The

specimens of *Strix sanctialbani* confirm Mr. Lydekker in the view that the Strigidæ must be subdivided into the families Strigidæ and Bubonidæ. (Proceeds. Zool. Soc. London, 1893.)

According to Mr. F. L. Ransome, the eruptive rocks of Point Bonita, California, are differentiated into two formations which, from chemical analysis, seem to have been derived from the same basic magma. One is compact, amygdaloidal, does not show crystals to the unaided eye and is markedly spheroidal in structure; the other is distinctly crystalline, traversed by irregular joint planes, and is not spheroidal. The latter is intrusive into the sandstones and is, therefore, of later age. The spheroidal basalt was probably poured out anterior to the deposition of the sandstone and afterwards elevated to its present position. The author believes the spheroidal structure to be a flow phenomena. The lava issued in a viscous condition, one sluggish outwelling of lava being piled upon another to form the whole mass of the flow. The former center of volcanic activity, as indicated by the character and position of these formations, probably lay to the seaward at some little distance off the present coast. (Bull. Dept. Geol. Univ. of California, Vol. 1, 1893.)